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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/690,762
Filing Date: October 22, 2003
Appellant(s): PELEG ET AL.

W. Allen Powell
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 9/13/2007 appealing from the Office action mailed 4/9/2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

WITHDRAWN REJECTIONS

The following grounds of rejection are not presented for review on appeal because they have been withdrawn by the examiner. The Examiner has withdrawn the rejection of claims 1, 5, 9, 16, and 27 under 35 U.S.C. 112 second paragraph.

The appellant's statement of the second and third grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,125,360	Witkowski et al.	9-2000

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-4 are rejected under 35 U.S.C. 101 because no implementation of computer hardware is found in these claims. The lack of computer hardware renders claims 1-4 as being software per se and therefore is nonfunctional descriptive material.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Witkowski et al ('Witkowski' hereafter) (U.S. Patent 6,125,360).

With respect to claim 1, Witkowski teaches a system that allows a table and a materialized view to be available while the materialized view is being refreshed, the system comprising:

a materialized view that is derived at least in part from a table (abstract and col. 4 line 37-41);

a refresh log that contains a plurality of entries (col. 9 line 40-50, col. 16 line 17-24 and figure 4c), each of the plurality of entries corresponding to a change in the table (col. 9 line 12-23, col. 16 line 17-33 and figure 4c), each of the plurality of entries comprising an epoch identifier (SCN) adapted to synchronize the refresh log between refreshing operations (col. 9 line 25-33); and

a refresh manager (figure 3) that performs a refresh operation on the materialized view in multiple steps by (a) successively reading a first subset of the plurality of entries indicated by a specific epoch identifier from the refresh log (col. 9 line 55-60), (b) identifying a second subset of the plurality of entries from within the first subset of the plurality of entries, the second subset of the plurality of entries falling within a primary key value boundary (database queries of columns 9 and 10) and (c) applying the second subset of the plurality of entries to the materialized view (col. 9 line 25-33).

With respect to claim 2, Witkowski teaches the system set forth in claim 1, wherein the corresponding epoch identifiers represent epoch numbers that have been created since a previous refresh operation on the materialized view (col. 9 line 18-23).

With respect to claim 3, Witkowski teaches the system set forth in claim 1, wherein the second subset of the plurality of entries is applied to the materialized view in a primary key order (col. 9 line 25-37 and figure 7).

With respect to claim 4, Witkowski teaches the system set forth in claim 1, wherein the refresh manager is adapted to distinguish between entries of the second subset of the plurality of entries that have already been applied to the materialized view in previous transactions and entries of the second subset of the plurality of entries that have not been applied to the materialized view in the event of a failure of the refresh operation (col. 9 line 55-col. 10 line 7 and col. 9 line 34-39).

With respect to claim 5, Witkowski teaches A method of refreshing a materialized view that is in part derived from a table, the method being adapted to improve the availability of the table and the materialized view while the materialized view is being refreshed, the method comprising:

deriving a materialized view from at least one table (abstract and col. 4 line 37-41);

assigning an epoch identifier (SCN) to changes made to the at least one table (col. 9 line 12-23, col. 16 line 17-33 and figure 4c);

storing an entry corresponding to each change to the at least one table in a refresh log that includes a plurality of entries (col. 9 line 40-50, col. 16 line 17-24 and

figure 4c), each of the plurality of entries comprising an epoch identifier (SCN) that is adapted to synchronize the refresh log between refreshing operations (col. 9 line 25-33); and

performing a refresh operation in multiple operations (col. 9, Incremental Refresh Operation), each of the multiple operations comprising (a) successively reading a first subset of the plurality of entries indicated by a specific epoch identifier from the refresh log (col. 9 line 55-60), (b) identifying a second subset of the plurality of entries from within the first subset of the plurality of entries, the second subset of the plurality of entries falling within a primary key value boundary (database queries of columns 9 and 10) and (c) applying the second subset of the plurality of entries to the materialized view (col. 9 line 25-33).

With respect to claim 6, Witkowski teaches the method set forth in claim 5, comprising applying the second subset of the plurality of entries to the materialized view in a primary key order (col. 9 line 25-37 and figure 7).

With respect to claim 7, Witkowski teaches the method set forth in claim 5, comprising defining the epoch identifier to correspond to changes that have been made to the table since a previous refresh operation on the materialized view (col. 9 line 18-23).

With respect to claim 8, Witkowski teaches the method set forth in claim 5, comprising distinguishing between entries of the second subset of the plurality of entries that have already been applied to the materialized view in previous transactions and entries of the second subset of the plurality of entries that have not been applied to the materialized view in the event of a failure of the refresh operation (col. 9 line 55-col. 10 line 7 and col. 9 line 34-39).

With respect to claim 9, Witkowski teaches A system that provides availability of a table and a materialized view while the materialized view is being refreshed, the table being derived at least in part from the materialized view, the system comprising:

a refresh log that contains a plurality of entries (col. 9 line 40-50, col. 16 line 17-24 and figure 4c), wherein the plurality of entries comprise data that is being refreshed (col. 9 line 24-67), each of the plurality of entries comprising an epoch identifier adapted to synchronize the refresh log between refreshing operations (col. 9 line 25-33); and

a refresh manager (figure 3) that computes a table delta (col. 9 line 13-26) based on the refresh log (col. 15 line 24-40 and col. 16 line 17 line1-10) and applies the table delta to the materialized view (col. 15 line 40-47 and figure 5).

With respect to claim 10, Witkowski teaches the system set forth in claim 9, wherein each of the plurality of entries comprises an epoch identifier (col. 9 line 18-23 SCN).

With respect to claim 11, Witkowski teaches the system set forth in claim 10, wherein the epoch identifier corresponds to changes that have been made to the table since a previous refresh operation on the materialized view (col. 9 line 18-23).

With respect to claim 12, Witkowski teaches the system set forth in claim 9, wherein the table delta is applied to the materialized view in a primary key order (col. 9 line 25-37 and figure 7).

With respect to claim 13, Witkowski teaches the system set forth in claim 9, wherein the table delta is used to refresh the materialized view in multiple transactions (col. 9 line 25-37 and figure 7).

With respect to claim 14, Witkowski teaches the system set forth in claim 9, wherein a primary key value for each entry from the refresh log is recorded after that entry is applied to the materialized view (col. 16 line 18-24 and figure 4c).

With respect to claim 15, Witkowski teaches the system for refreshing the materialized view set forth in claim 9, wherein the refresh manager is adapted to distinguish between a first subset of the plurality of entries that have already been applied to the materialized view in previous transactions and a second subset of the plurality of entries that have not been applied to the materialized view in the event of a failure of the refresh operation (col. 9 line 55-col. 10 line 7 and col. 9 line 34-39).

With respect to claim 16, Witkowski teaches a method of refreshing a materialized view that is derived at least in part from a table, the method being adapted to provide availability of the table and the materialized view while the materialized view is being refreshed, the method comprising the acts of:

storing a plurality of entries corresponding to changes in the table in a refresh log wherein the plurality of entries comprise data that is being refreshed (col. 9 line 40-50, col. 16 line 17-24 and figure 4c), each of the plurality of entries comprising an epoch identifier (SCN) adapted to synchronize the refresh log between refreshing operations (col. 9 line 25-33);

computing a table delta based on the refresh log (col. 9 line 13-26 and col. 15 line 25-32);

refreshing the materialized view based on the table delta (abstract and col. 9 Incremental Refresh Operation section).

With respect to claim 17, Witkowski teaches the method set forth in claim 16, wherein the table delta is applied to the materialized view in a primary key order (col. 9 line 25-37 and figure 7).

With respect to claim 18, Witkowski teaches 18 the method set forth in claim 16, comprising updating the materialized view in multiple transactions (col. 9 line 25-37 and figure 7).

With respect to claim 19, Witkowski teaches the method set forth in claim 16, comprising storing an epoch identifier as a portion of each of the plurality of entries (col. 9 line 18-23 SCN).

With respect to claim 20, Witkowski teaches the method set forth in claim 19, comprising defining the epoch identifier to correspond to changes that have been made to the table since a previous refresh operation on the materialized view (col. 9 line 18-23).

With respect to claim 21, Witkowski teaches the method set forth in claim 16, comprising recording the primary key value for each entry from the update log after that entry is applied to the materialized view (col. 16 line 18-24 and figure 4c).

With respect to claim 22, Witkowski teaches the method set forth in claim 16, comprising distinguishing between a first subset of the plurality of entries that have already been applied to the materialized view in previous transactions and a second subset of the plurality of entries that have not been applied to the materialized view in the event of a failure of the act of refreshing the materialized view (col. 9 line 55-col. 10 line 7 and col. 9 line 34-39).

With respect to claim 23, Witkowski teaches a system that provides availability of a table and a materialized view while the materialized view is being refreshed, the table being derived at least in part from the materialized view, the system comprising:

a refresh log that contains a plurality of entries (col. 9 line 40-50, col. 16 line 17-24 and figure 4c), wherein the plurality of entries comprise data that is being refreshed (col. 9 line 24-67), each of the plurality of entries comprising an epoch identifier adapted to synchronize the refresh log between refreshing operations (col. 9 line 25-33); and

means for computing a table delta based on the refresh log (col. 9 line 13-26 and col. 15 line 25-32); and

means for applying the contents of the table delta to the materialized view (abstract and col. 9 line 25-55).

With respect to claim 24, Witkowski teaches the system set forth in claim 23, wherein each of the plurality of entries comprises an epoch identifier (col. 9 line 18-23 SCN).

With respect to claim 25, Witkowski teaches the system set forth in claim 24, wherein the epoch identifier corresponds to changes that have been made to the table since a previous refresh operation on the materialized view (col. 9 line 18-23).

With respect to claim 26, Witkowski teaches the system set forth in claim 23, wherein the means for applying the table delta to the materialized view is adapted to

distinguish between a first subset of the plurality of entries that have already been applied to the materialized view in previous transactions and a second subset of the plurality of entries that have not been applied to the materialized view in the event of a failure of applying the table delta to the materialized view (col. 9 line 55-col. 10 line 7 and col. 9 line 34-39).

With respect to claim 27, Witkowski teaches a computer readable medium, comprising:

a refresh log stored on the machine readable medium, the refresh log containing a plurality of entries each of the plurality of entries (col. 9 line 40-50, col. 16 line 17-24 and figure 4c) comprising an epoch identifier (col. 9 SCN) adapted to synchronize the refresh log between refreshing operations, wherein one of the plurality of entries comprises refreshable data associated with a materialized view (col. 9 line 25-33 and col. 9 line 24-67); and

code adapted to refresh the materialized view at least in part from a table by computing a table delta based on the refresh log and applying the table delta to the materialized view.

With respect to claim 28, Witkowski teaches the computer program set forth in claim 27, wherein each of the plurality of entries comprises an epoch identifier (col. 9 line 18-23 SCN).

With respect to claim 29, Witkowski teaches the computer program set forth in claim 28, wherein the epoch identifier corresponds to changes that have been made to the table since a previous refresh operation on the materialized view (col. 9 line 18-23).

With respect to claim 30, Witkowski teaches the computer program set forth in claim 27, wherein the refresh manager is adapted to distinguish between a first subset of the plurality of entries that have already been applied to the materialized view in previous transactions and a second subset of the plurality of entries that have not been applied to the materialized view in the event of a failure of a refresh operation (col. 9 line 55-col. 10 line 7 and col. 9 line 34-39).

(10) Response to Argument

A. **Ground of Rejection No. 1:**

Appellant's arguments, see page 7 of the Brief, with respect to claims 1, 5, 9, 16, and 27 have been fully considered and are persuasive. The 35 U.S.C. 112 second paragraph rejection of claims 1, 5, 9, 16, and 27 have been withdrawn.

B. **Ground of Rejection No. 2:**

Appellant's arguments with respect to the rejection of claims 1-4 under 35 U.S.C 101 (pages 8-10 of the Brief) have been fully considered but they are not persuasive.

Claims 1-4 (see rejection above) have been rejected under 35 U.S.C. 101 because no implementation of computer hardware is found in these claims. As claims 1-4 are system claims, they lack implementation of hardware to actually define a system. Therefore, as can be reasonably interpreted, claims 1-4 can be construed as software *per se* (i.e. a "software" system) because they lack hardware essential to perform the functionality of the claim. By lacking the necessary hardware to define a system, claims 1-4 are merely a program listing and thus, in other words, functional descriptive material. With respect to functional descriptive material, MPEP 2106.01 [R-5] section I holds:

[Similarly,] computer programs claimed as computer listings per se, i.e., the descriptions or expressions of the programs, are not physical "things." They are neither computer components nor statutory processes, as they are not "acts" being performed. Such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer which permit the computer program's functionality to be realized.

For the reasons that claims 1-4 lack hardware and can be interpreted as software *per se*, the 35 U.S.C. 101 rejection of these claims are sustained.

Furthermore, the Examiner notes that found in Appellant's arguments are statements concluding that because claims 1-4 produce a useful, concrete, and tangible result, recite statutory subject matter (i.e. see Brief, page 9, lines 1-3 of the first full paragraph). The Examiner submits that although the Appellant addresses the practical application requirement, the core issue (i.e. the claims being software *per se* for lacking hardware) is not contended.

C. **Ground of Rejection No. 3:**

Appellant's arguments with respect to the rejection of claims 1-30 under 35 U.S.C 102 (pages 10-12 of the Brief) have been fully considered but they are not persuasive.

The Appellant argues (page 11 second paragraph of the Brief) that Witkowski doe not disclose an epoch identifier adapted to synchronize the refresh log between refreshing operations. The Examiner disagrees given the following:

Witkowski discloses in column 9, line 25, a method of an incremental refresh operation. In this method, an incremental refresh is performed by applying Dlt_Ti (delta table for table Ti) to MV (i.e. a Materialized View) (col. 9 line 28-32). The Examiner submits that the delta table (Dlt_Ti) is synonymous with and thus describes the claimed refresh log. This can simply be concluded because the claimed refresh log "contains a plurality of entries, each of the plurality of entries corresponding to a change in the table." Likewise, Witkowski's delta table stores the rowid rows of the table which have changed (Witkowski, col. 9 line 12-14). Further, Witkowski teaches a "delta table" SNLog that stores for each changed row of table Ti, (1) the rowid of the changed row, and (2) the scn that indicates the logical time at which the row was changed (Witkowski, col. 9 line 45-48). Because Witkowski teaches a refresh log (i.e. delta table SNLog_Ti) that contains a plurality of entries (rowids and scn's) corresponding to a change in the table (i.e. the rowids and scn's correspond to changes of rows in a table) that the delta table SNLog_Ti describes Appellant's claimed refresh log.

With Witkowski describing the refresh log, they also described the claimed epoch identifier (as an SCN) adapted to synchronize the refresh log between refreshing operations.

That is, Witkowski teaches the use of an SCN (System Change Number) assigned to transactions in commit time order (col. 9 line 17-18). The SCN indicates the logical time at which the row was changed (col. 9 line 47-48; i.e. the SCN corresponds to a change in the table). The SCN further describes Appellant's "epoch identifier" because of the steps in claim 1 utilizing the epoch identifier. That is, in step (a), claim 1 states "successively reading a first subset of the plurality of entries indicated by a specific epoch identifier from the refresh log". In column 9, lines 55-60, Witkowski illustrates a query that reads a first subset of the plurality of entries indicated by a specific epoch identifier from the refresh log. In other words, Witkowski teaches retrieving a specified range of SCN (col. 9 lines59-60) as a first subset of the plurality of entries from the SNLog (i.e. Appellants' refresh log).

Step (b) of claim 1 states "identifying a second subset of the plurality of entries from within the first subset of the plurality of entries, the second subset of the plurality of entries falling within a primary key range". Furthermore to note Witkowski teaching this limitation, the query (top of column 10) describes creating a VTi (a view of the delta table containing the SCNs). That, is a subset of the entries of the Dlt_Ti is chosen to be included in the VTi table. The subset chosen is done so in primary key order (i.e. Ti.rowid = Dlt_Ti.rid wherein 'rowid' and 'rid' are primary keys).

The Examiner submits that from Witkowski teaching the above steps that Witkowski would obtain the benefits of avoiding inclusion of records to transactions that occurred outside a refresh time range or omit records corresponding to transactions that actually within a particular refresh time range (i.e. column 9, line 55-60 shows a query retrieving *only* the SCN s within a refresh time range).

Moreover, Witkowski teaches the epoch identifier is adapted to synchronize the refresh log between refreshing operations.

The Examiner submits that the delta table SNLog_Ti stores in part the SCN (system change number that indicates the logical time at which a change was made (col. 9 line 21-23)). Therefore, the SCN produces and ordering scheme (i.e. logical timing) within the delta table SNLog_Ti. Furthermore, the Examiner submits that snapshot logs may be used to record changes that have been made to base tables after the most recent MV (materialized view) refresh (Witkowski, col. 16 line 21-25). The delta table SNLog is also seen as a snapshot log because both contain entries corresponding to changes in a table. In either case of the SNLog or snapshot log, the inclusion of an SCN into a SNLog at least inherently teaches "synchronizing the refresh log between refreshing operations." In other words, the Examiner submits that the SCNs that are recorded between refresh operations keep the SNLog (claimed refresh log) current and therefore *synchronized* with the changes made to the table. Witkowski describes the use of SCNs between refresh operations (col. 9 lines 50-60) and teaches recording the changes that have been made *after the most recent MV refresh* (col. 16 line 21-23). The Examiner also submits because the SCN indicates a logical time in

change, that the SCN keeps the refresh log synchronized with the changes made (i.e. the changes in SNLog are kept consistent with the logical time at which they were made and thus are synchronized).

Furthermore, in response to Appellant's arguments in section 3 grounds of rejection (page 12, first full paragraph), the Appellant states that the SCN of Witkowski is generally a timestamp. The Examiner disagrees as the SCN of Witkowski is defined as a *logical* time at which a change was made. Therefore, Appellant's assertion is incorrect because a timestamp is well known to include the *actual* time when a change was made. At no point in Witkowski's disclosure is an SCN defined as a timestamp. As broadly defined in the claims, Witkowski's SCN sufficiently describes the claimed epoch identifier (i.e. both the SCN and the epoch identifier serve the same purpose: to synchronize the refresh log between operations). The Examiner also wishes to note that the present claims do not disclose any changing of the epoch identifier as specified by Appellant (page 12, first paragraph, lines 3-5).

In response to Appellant's second paragraph on page 12 of the Brief, it is noted that the term "steps" is used in the present claims to describe iterations of a refresh operation. In response to this note, the Examiner submits that the "steps" in the claims can easily be construed as different invocations of the refresh operation rather than different transactions that are part of the same refresh operation (for example, Witkowski teaches the claimed steps in an *incremental* (i.e. suggesting steps; *col. 9 line*

25) operation). The Examiner submits that the Appellant is simply relying on their specification to describe the "steps" as iteration because no iteration step is described or can clearly be interpreted from the claims. In other words, there is no returning step to specify any repetitions or [multiple] iterations of the steps.

Further, the Examiner maintains that the claimed refresh manager can be found in figure 3. Specifically, Witkowski describes figure 3 as a computer system on which an embodiment of the invention may be implemented. As the system steps of claim 1 are taught by Witkowski, this is an embodiment that may be performed by thief figure 3. For example, as can be reasonably interpreted, the claimed refresh manger is simply a processor of information that performs multiple steps. Likewise, the Examiner submits that it can reasonably interpreted that the processor (304) of Witkowski's figure 3 is a component of a computer system that can implement the embodiments of their invention (e.g. the incremental update).

The Appellant also states that the cited figure does not even appear to illustrate a database system in general. In contrast to this assertion, the Examiner submits that figure 3 comprises a server (330) which, in the least illustrates a database system (Witkowski's abstract also suggests the server being a database server to teach a database system). Also to mention, Witkowski is replete with illustrating a database system in other figures (i.e. at least figures 4A-C and 6A-B).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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